HEAVY CONSTRUCTION EQUIPMENT OPERATOR

SCRAPER PHASE

TABLE OF CONTENTS

PREFACE

To the student: The purpose of this handout is to provide guidance and knowledge on how to perform operator's maintenance and operate a motorized scraper. Within this handout are sections covering proper procedures for: Basic operating skills, PMCS, Push loading, Excavate material, Spread fill material, Construct a tank ditch, and Construct a berm with the scraper.

OBJECTIVE

The objective of this handout is to provide the knowledge required to build the skills, which are necessary to operate and maintain the motorized scraper proficiently in the following areas;

1. Preventive Maintenance.
2. Pusher assist.
3. Excavate material.
4. Spread fill material.

CHAPTER 1

1.What this document is:

(1) This is a job aid for performing tasks associated with the scraper. It is to be used with TM 5-3805-248-14 & P-1 Scraper, Earthmoving 621 B, August 1985, and STP 5-62E12-SM-TG, Sept. 85. Together, the two job aids provide a model for maintaining and operating the scraper

2.Who should use it:

a. Students who are attending the Equipment Operators Course: Instructions for its use will be provided by the instructors of the course.

b. Graduates of the Equipment Operators Course: This job aid should be kept upon graduating from the course. It provides a valuable reference for accomplishing scarper tasks. Tasks that are not trained in school (Unit Trained Tasks) are also covered in this job aid. Upon arriving at your first duty station you may learn how to do these tasks by using this reference in conjunction with the technical manual and Soldier's manual (STP 5-62E12-SM-TG)

c. Supervisors of Heavy Construction Equipment Operators: This booklet provides the basic procedures for performing scraper tasks. Chapter 2 can be used for an Introduction to Scraper when cross-training. The other chapters may be used to instruct the basic procedures for performing a task. The last chapter provides performance evaluations for testing.

3.How to use it:

a. Chapter two is an introduction to the scraper. It is issued in a classroom environment. An instructor may use it for the lesson outline, however he must first study the references in order to "beef up" the material. The student uses it as an outline for taking notes.

b. The following chapters cover a specific task fro scraper operations. Each chapter provides the following information:

(1) PURPOSE: A brief description of the reason for performing the task.

(2) REFERENCE: Other sources of information about the task.

(3) PRODUCT: The products that result by performing the task.

(4) PROCEDURES: How to perform the task.

(5) The last chapter provides a checklist for performance evaluations.

c. Every attempt has been made to follow established procedures and doctrine. In instances where it deviates, In instances where it deviates, from other references a note is made on the reason for doing so and the name of the reference.

4.Ordering and input Information:

a. Additional copies of this job aid can be obtained from:

(1) Commanding Officer
(2) Marine Corps Detachment
(3) 1273 Iowa Ave
(4) Fort Leonard Wood, Missouri 65473

b. Your input into this job aid is welcomed. Send your comments to:

(1) Commanding Officer
(2) Marine Corps Detachment
(3) 1273 Iowa Ave
(4) Fort Leonard Wood, Missouri 65473

CHAPTER 2

INTRODUCTION TO THE SCRAPER

1.PURPOSE: To prepare the student to be able to understand the technical training lessons that will follow. It will include a briefing on the characteristics, major components, operating systems, controls, instruments, and uses of the scraper.

2.SAFETY: Know and adhere to all hand signals. Maintain three points of contact when mounting or dismounting. Ground all attachments and engage park brake before dismounting. Make a 360 walk-around before mounting and after dismounting. Seat belt will be worn. Go slow under dusty conditions.

3.REFERENCES:

a. TM5-434, Earthmoving Operations, 30 Sep 92

b. TM 5-3805-248-14 & PI, P3 Scraper, Earth Moving, Motorized Diesel Engine Driven, Caterpillar Model 621B, 19 Aug 85.

c. TM 5-2410-237-10, Tractor, Full Tracked, Low-Speed: DDED, Medium Drawbar Pull, D7G, Jan 1993.

d. STP 5-62E12-SM-TG, all scraper technical tasks.

4.LESSON OUTLINE:

a. The following is a brief outline of what the instructor will present in class. You may use this outline to make your own notes.

(1) Nomenclature:

(a) Types:

1 Scraper, earthmoving motorized, 621-B (pusher assisted).

2 Scraper, earthmoving, motorized, 613-B (self loading)

(b) Classified by:

1 Weight

2 Rim pull

(c) Components:

1 Single axle

2 4 wheeled with pneumatic tires.

3 330 H.P. 6 cylinder turbocharged diesel engine.

4 Semi-automatic transmission:

a Shifts automatically at optimum RPM's

b Operator can concentrate on other controls.

c Component life is increased.

d Chance of engine over speed is greatly reduced.

(d) Capabilities:

1 All weather operation.

2 High ground clearance: 18 inches.

3 Adjustable cutting edge.

(2) Excavation:

(a) Cut width: 119 inches.

(b) Maximum cut depth: 13.4 inches.

(c) Capacity: Struck 14 cy, heaped 18 cy.

(d) Penetration: With stinger bit extended.

NOTE: Depth of cut, capacity, and penetration depends largely upon the type of earth being worked, skill of the operator, pusher assistance available, etc.

ENVIRONMENTAL: While moving in off road terrain, avoid unnecessary damage to waterways or vegetation.

ENVIRONMENATAL: Dust and exhaust created by the use of equipment also affects the environment, avoid any unnecessary equipment usage.

(3) Haul:

(a) High speed: 31 MPH max.

(b) Long distance: 300' – 5000' optimum.

NOTE: It is recommended that hauling distances be kept as short as possible to maximize equipment life and fuel economy.

(c) Vehicle turning radius 18 feet 3 inches, U-turn, 36 feet, 6 inches. Spread Depth: 18 inches.

NOTE: Spread depth will increase to a maximum of 36 inches after rear wheels reach and climb upon ramp made by first 18 inch spread.

(4) Leveling: Haul road and job site maintenance

NOTE: Insure stinger bit is reversed if so equipped.

(5) Limitations:

(a) Pusher assistance required to shorten load time.

(b) High ground bearing pressure.

(6) Operating techniques:

(7) Transmission

(a) 8 forward speeds, 1 reverse.

(b) Downshift inhibitor.

(c) Transmission hold pedal.

(d) Differential lock pedal.

(e) Retarder equipped.

(f) Transmission lockout.

(8) Production Techniques:

(a) Downhill loading: Uses force of gravity, increases production

(b) Straddle loading: Increases production on 3rd pass.

NOTE: The island between the first two cuts must be no wider than the distance between the scraper's wheels.

(c) Pump loading: Used when loading sand.

(d) Chain loading long, continuous cut with two or more scrapers.

(e) Shuttle loading: Short cuts in both directions.

(f) Backtrack loading: Short cuts, impractical to load in both directions.

ENVIRONMENTAL: Once you have completed the project, restore the area as close as possible to its original state.

(9) Safety

(a) Do a 360-degree walk-around.

1 Prior to mounting

2 After dismounting.

(b) Wear hearing protection hard hats, and seatbelts at all times when operating equipment.

(c) Maintain 3 points of contact when mounting and dismounting equipment (facing equipment).

CAUTION: Always face the machine when entering/exiting the cab to prevent injury and maintain 3 points of contact. Never grab the steering wheel when mounting or dismounting.

(d) Adjust mirror.

(e) Keep scraper under control at all times.

ENVIRONMENTAL: The operator must constantly be aware of any equipment leaks, and correct them before they become a hazard.

(10) Major components:

(a) Engine:

1 6 cyl. Diesel.

2 Turbocharged.

NOTE: 3-5 minute cool-down period required.

(b) Lubrication:

1 Engine Oil: 15W40

2 Dipstick: Hot & Cold check

3 Filters

(c) Fuel system

1 Fuel tank: 135-Gallon

2 Dipstick: 30% minimum

3 Filters/primer pump

(d) Air induction system:

1 Air filters: Two stage

2 Restriction indicator

(e) Cooling system:

1 Capacity: 20 Gallons

2 Coolant mix: 50% coolant/50% water

3 Fan assembly and belts: Self adjusting

(f) Hydraulic system: 10 weight oil

1 Pressurized

2 Sight gauge

(g) Differential/Final drives: 80/90 weight or 85/140 weight

1 Differential levels

2 Final drive levels

3 Type of oil & capacity

4 Transmission 15w40 oil

(h) Tires & wheels

1 Directional

2 Air pressure

a Front: 60 psi

b Rear: 40 psi

(i) Scraper/pan

1 14 cubic yard struck capacity

2 18 cubic yard heaped capacity

3 Apron

4 Ejector

5 Draft arms

6 Cutting edges/router bits

7 Hydraulic cylinders/double acting

(11) Controls and instruments

(a) Headlight dimmer switch

(b) Transmission hold pedal

(c) Differential lock

(d) Brake pedal

(e) Accelerator pedal

(f) Flood light switch

(g) Supplemental steering light

(h) Standard military light switch

(i) Tachometer

(j) Starting aid switch

(k) Start switch

(l) Torque converter and retarder temperature gauge

(m) Panel light

(n) Engine retarder control

(o) Turn signal switch

(p) Windshield wiper control

(q) Hour-meter

(r) Air pressure gauge

(s) Amp-meter gauge

(t) Oil pressure gauge

(u) Engine temperature gauge

(v) Panel light

(w) Low air pressure light

(x) Warning horn shut-off switch

(y) Parking brake button

(z) Horn

(aa) Battery disconnect switch

(bb) Heater/ventilation control lever

(cc) Transmission control lever

(dd) Scraper controls:

1 Bowl control lever

a Raise

b Hold

c Lower

d Quick drop

e Additional function feature

2 Apron control lever:

a Hold

b Open

c Close

d Float

3 Ejector control lever

a Forward (eject load)

b Hold

c Back

d Automatic ejector return kick-out

(ee) Seat adjustments

1 Height

2 Forward & back

3 Cushion

(ff) Hand signals: Explain hand signals as listed in the student guide.

(gg) Park-line

1 Park brake set

2 Transmission in neutral

3 Neutral safety lock engaged

4 Bowl on ground

5 Ejector forward

6 Apron closed and in float

(hh) Park-line when loaded

1 Park brake set

2 Transmission in neutral

3 Neutral safety lock engaged

4 Bowl on ground

5 Ejector to the rear

6 Apron closed and in float

(ii) Cut set-up

1 Ejector to the rear

2 Bowl 1” off of the ground

3 Apron open to three knuckles 12-15”

(jj) Travel position

1 Empty

2 Bowl 4-6” off of the ground

3 Apron closed and in float

4 Ejector to the front

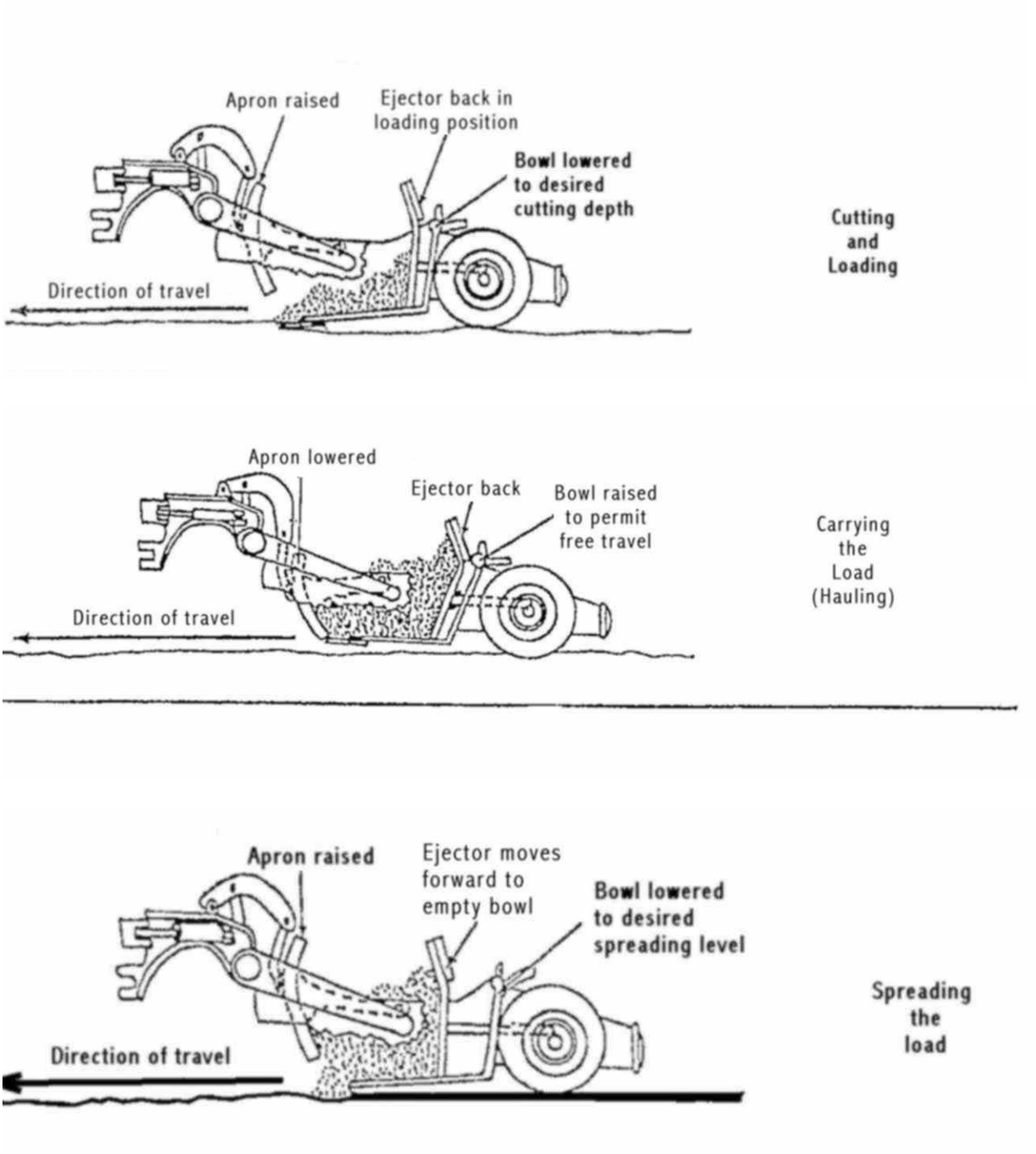
5 Loaded

6 Bowl 4-6” off of the ground

7 Apron closed and in float

8 Ejector to the rear

Figure 2-1



DISENGAGE PARK BRAKE

ENGAGE PARK BRAKE

LINE UP ON INSTRUCTOR

PERSON BETWEEN EQUIPMENT

CHANGE OVER

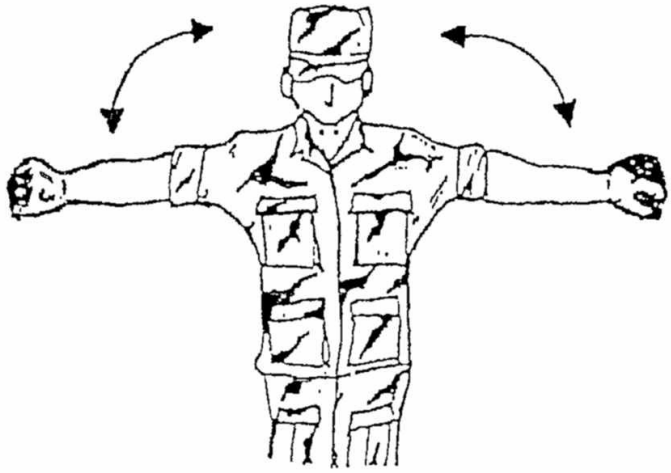
ENGAGE DIFFERENTIAL LOCK

RAISE BOWL

APRON OPEN

LOWER BOWL

APRON CLOSED

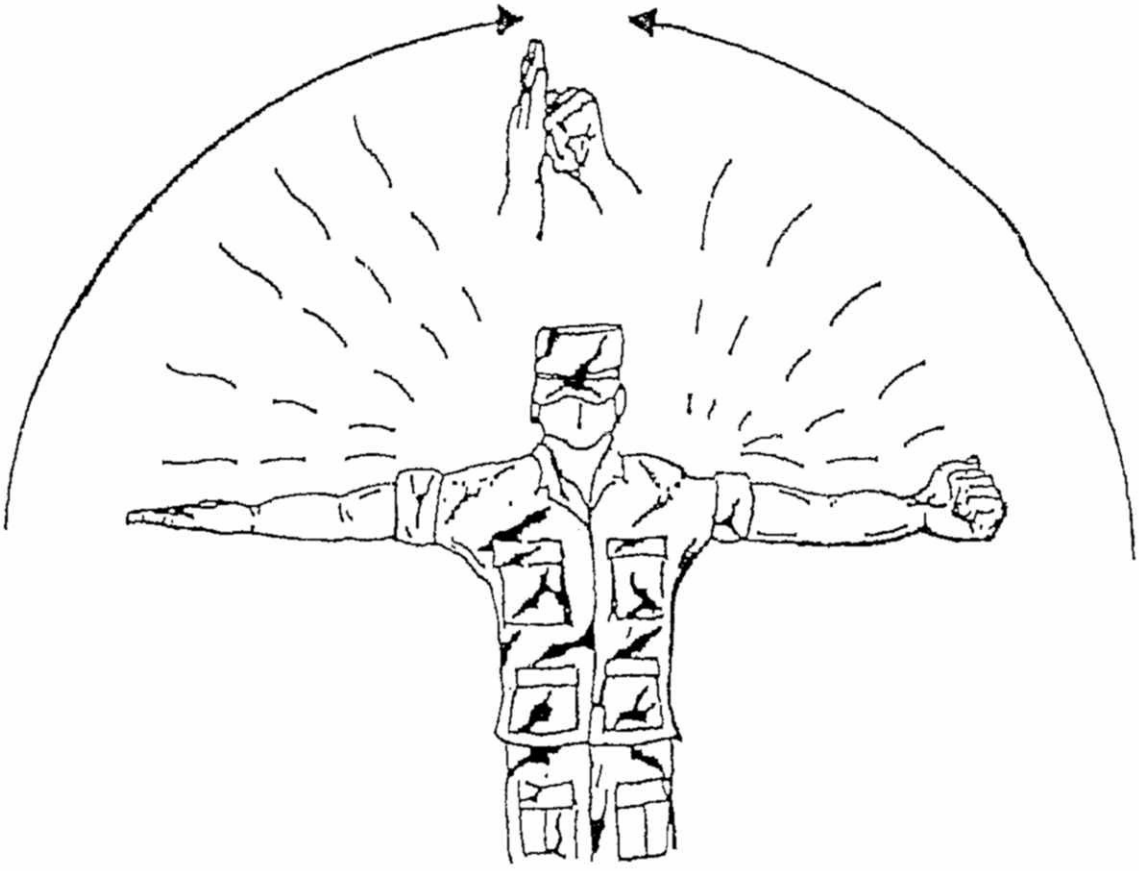


EJECTOR TO REAR

EJECTOR FORWARD

CUT

ADDITIONAL FUNCTION



SPREAD OR OPEN

CHAPTER 3

PREENTIVE MAINTENANCE CHECKS AND SERVICES

1.PURPOSE: To provide the student with the skills and knowledge necessary to maintain and operate a motorized scraper.

2.SAFETY: Know and adhere to all hand signals. Maintain three points of contact when mounting and dismounting the scraper. Ground all attachments and engage park brake before dismounting the scraper. Make a 360-degree walk-around before mounting and after dismounting. Seat belt will be worn. Go slow under dusty conditions.

3.REFERENCE: TM 5-3805-248-14&P-1, P-3 and DA PAM 738-750.

4.PRODUCTS: Properly complete DA FORM 2404, DD FORM 1970, and a well-maintained scraper.

5.PROCEDURES:

a. Any equipment operator or mechanic can be trained to detect a breakdown and get it fixed. The real skill is to recognize a potential problem and prevent it from happening. That’s where preventive maintenance comes in.

b. The key to successful preventive maintenance is the Equipment Record Folder. You will be mainly concerned with two documents DA FORM 2404 and DD DORM 1970.

- Concise
- Easy to read
- Up-to-date
- Complete

(1) These records should indicate what has been done, when it was done, and what needs to be done.

(2) Shown on the next few pages are the two forms you must complete. You can use them to make notes on.

MOTOR EQUIPMENT UTILIZATION RECORD

DATE (YYMMDD)	TYPE OF EQUIPMENT	REGISTRATION NO./SERIAL NO.	ADMINISTRATION NO.

ORGANIZATION NAME	ACTION	TIME	MILES	HOURS	FUEL	OIL
1ST OPERATOR (*Last Name, First, M.I.*)	IN				REPORT TO (*Last Name, First, M.I.*)	
	OUT					
OPERATOR'S SIGNATURE	*TOTAL*				DISPATCHER'S SIGNATURE	
2D OPERATOR (*Last Name, First, M.I.*)	IN				REPORT TO (*Last Name, First, M.I.*)	
	OUT					
OPERATOR'S SIGNATURE	*TOTAL*				DISPATCHER'S SIGNATURE	
3D OPERATOR (*Last Name, First, M.I.*)	IN				REPORT TO (*Last Name, First, M.I.*)	
	OUT					
OPERATOR'S SIGNATURE	*TOTAL*				DISPATCHER'S SIGNATURE	
4TH OPERATOR (*Last Name, First, M.I.*)	IN				REPORT TO (*Last Name, First, M.I.*)	
	OUT					
OPERATOR'S SIGNATURE	*TOTAL*				DISPATCHER'S SIGNATURE	

DESTINATION	TIME		RELEASED BY (*Signature*)	REMARKS
	ARRIVE	DEPART		
FROM 1.				
TO 2.				
TO 3.				
TO 4.				
TO 5.				
TO 6.				
TO 7.				
TO 8.				
TO 9.				
TO 10.				
TO 11.				
TO 12.				
TO 13.				
TO 14.				
TO 15.				
TO 16.				

DD Form 1970, APR 81 (EG) EDITION OF FEB 75 MAY BE USED.

TO 17.				
TO 18.				
TO 19.				
TO 20.				
TO 21.				
TO 22.				
TO 23.				
TO 24.				
TO 25.				
TO 26.				
TO 27.				
TO 28.				
TO 29.				

INSTRUCTIONS

*1. *Date*. Enter the calendar date the equipment is to be used.

2. *Type of Equipment*. Enter the type of equipment as designated in the equipment log.

3. *Registration Number or Serial Number*. Enter the equipment/registration number or serial number.

4. *Administration Number*. Enter the unit number or administrative number.

5. *Organization Name*. Enter the organization to which the equipment is assigned.

*6. *Operator*. Enter the name of the equipment operator.

7. *Operator's Signature*. The equipment operator (item 6) will enter signature immediately upon receipt of equipment.

*8. *Time*. Indicate time to the nearest 5 minutes using the 24-hour clock.

a. In. Enter time equipment was returned from dispatch or use.

b. Out. Enter the time the equipment was released for operation by the dispatcher.

c. Total. Enter total time the equipment was in the possession of the operator. Time is obtained by subtracting the time listed in "Out" line from that listed on the "In" line.

*9. *Miles*. Will be recorded to the nearest whole mile.

a. In. The operator will enter the mileage reading when the equipment is returned. If odometer is inoperative, enter estimated mileage.

b. Out. The dispatcher will enter the mileage reading at the time of dispatch.

c. Total. Enter the difference between the "Out" and "In" mileage.

*10. *Hours*. Will be recorded to the nearest whole hour. On those items which require servicing on an hourly basis and are not equipped with an hour meter, enter the estimated hours of operation.

a. In. The operator will enter the hour meter reading upon completion of the equipment usage.

b. Out. The dispatcher will neter the hour meter reading prior to equipment release.

c. Total. Enter the total hours dispatched for operation.

11. *Fuel/Oil*. Enter the amount of fuel (gallons) and/or oil (quarts) obtained for the equipment.

*12. *Report To*. Enter the name of the individual to whom the operator is to report.

13. *Dispatcher's Signature*. Self-explanatory.

14. *Destination*. Indicate each location at which a trip begins and ends. Normally this starts from the equipment pool ("From" Line) and ends at the same place after one or more intervening destinations.

*15. *Time*. All time will be recorded using the 24 hour clock, rounded off to the nearest 5 minutes.

a. Arrive. Enter the arrival time at each destination.

b. Depart. Enter the departure time from the motor pool and each succeeding location.

16. *Released By*. The person in charge of equipment on dispatch will release by signing on the line indicating the destination where the equipment was released to the operator. Upon termination of equipment used, but not moved, the person in charge will release the equipment by signing in the top block of this column.

17. *Remarks*. The remarks column will be used by the operator to record unusual operation or abnormal occurrences during operation, or other information as directed.

*Items marked with an asterisk (*) have been registered in the DOD Data Element Program.

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET

For use of this form, see DA PAM 738-750 and 738-751; the proponent agency is DCSLOG

1. ORGANIZATION					2. NOMENCLATURE AND MODEL		
3. REGISTRATION/SERIAL/NSN	4a. MILES	b. HOURS	c. ROUNDS FIRED	d. HOT STARTS	e. DATE		f. TYPE INSPECTION

7. APPLICABLE REFERENCE			
TM NUMBER	TM DATE	TM NUMBER	TM DATE

COLUMN a — Enter TM item number.

COLUMN b — Enter the applicable condition status symbol.

COLUMN c — Enter deficiencies and shortcomings.

COLUMN d — Show corrective action for deficiency or shortcoming listed in Column c.

COLUMN e — Individual ascertaining completed corrective action initial in this column.

STATUS SYMBOLS

"X"—Indicates a deficiency in the equipment that places it in an inoperable status.

CIRCLED "X"—Indicates a deficiency, however, the equipment may be operated under specific limitations as directed by higher authority or as prescribed locally, until corrective action can be accomplished.

HORIZONTAL DASH "(-)"—Indicates that a required inspection, component replacement, maintenance operation check, or test flight is due but has not been accomplished, or an overdue MWO has not been accomplished.

DIAGONAL "(/)"—Indicates a materiel defect other than a deficiency which must be corrected to increase efficiency or to make the item completely serviceable.

LAST NAME INITIAL IN BLACK, BLUE-BLACK INK, OR PENCIL-Indicates that a completely satisfactory condition exists.

FOR AIRCRAFT-Status symbols will be recorded in red.

ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.

8a. SIGNATURE *(Person(s) performing inspection)*	8b. TIME	9a. SIGNATURE *(Maintenance Supervisor)*	9b. TIME	10. MANHOURS REQUIRED

TM ITEM NO. a	STATUS b	DEFICIENCIES AND SHORTCOMINGS	CORRECTIVE ACTION d	INITIAL WHEN CORRECTED e

c. Once you have completed the first part of your paperwork, it is time to perform your before checklist maintenance.

(1) Preventive maintenance checks are ALWAYS DONE BY THE BOOK. Use the preventive maintenance checklist that is located in your TM.

(2) The checks do not have to be performed in the same steps as in the book, but all checks must be performed. Always do your preventive maintenance in the same order so that it gets to be a habit. Once you have had some practice, you will spot anything wrong at a glance.

(3) If you locate something that you cannot fix, then record in on DA FORM 2404.

d. Once you have completed your before operations maintenance then it is time to perform lubrication IAW lube order.

e. Once you have completed your mission with the equipment you must perform after operation preventive maintenance, IAW the operator's manual.

f. Once after operation preventive maintenance is done you must complete the required spaces on DA FORM 2404 & DD FORM 1970. Deadline deficiencies properly annotated, and forms turned into instructor/ supervisor/dispatcher which ever applies.

g. Shown on the following pages, is the operator's level preventive maintenance checks:

PAGES FROM TM MANUAL TM 5-3805-248-14&p-3

h. Lubrication is another important part of maintaining your equipment. Along with following the lubrication order, which indicates lube intervals, other reasons to lubricate are:

(1) Working in dusty conditions.

(2) Equipment having worked with attachments under water.

i. While lubricating the equipment, there are several things to keep in mind that will keep the equipment operating properly:

(1) Do not lubricate items that do not require it.

(2) Wipe off all grease fittings prior to lubricating.

(3) Wipe off all grease fittings after lubricating.

(4) Keep lubricants in their container, and free of foreign matter.

NOTE: These precautions will prevent unnecessary damage to the moving parts of the equipment.

CHAPTER 4

PUSH LOAD THE SCRAPER WITH THE CRAWLER TRACTOR

1.PURPOSE: To provide the student with the guidelines and knowledge necessary to push load a scraper with the dozer.

2.SAFETY: Know and adhere to all hand signals. Maintain three points of contact when mounting or dismounting. Ground all attachments and engage park brake before dismounting. Make 360 degree walk-around before mounting and after dismounting. Seat belt will be worn. Go slow under dusty conditions.

3.REFERENCES:

a. TM 5-434, Earthmoving Operation, 30 Sept 92

b. TM 5-3805-248-14-P1 &PI, P3 Scraper, Earth Moving Motorized Diesel

c. Engine Driven, Caterpillar Model 621B, 19 August 85.

d. TM 5-2410-237-10, Tractor, Full Tracked, Low Speed: DED, Medium Drawbar Pull, D7G, 20 January 1989.

e. STP 5-62E12-SM-TG, Tasks 051-254-1043,1063, 25 Sept 1985,

4.PRODUCTS: Properly trained operator in the techniques of push loading a scraper with the crawler tractor.

5.PROCEDURES:

6.ENVIRONMENTAL: Be aware of these environmental considerations:

While moving in off road terrain, avoid unnecessary damage to waterways or vegetation.

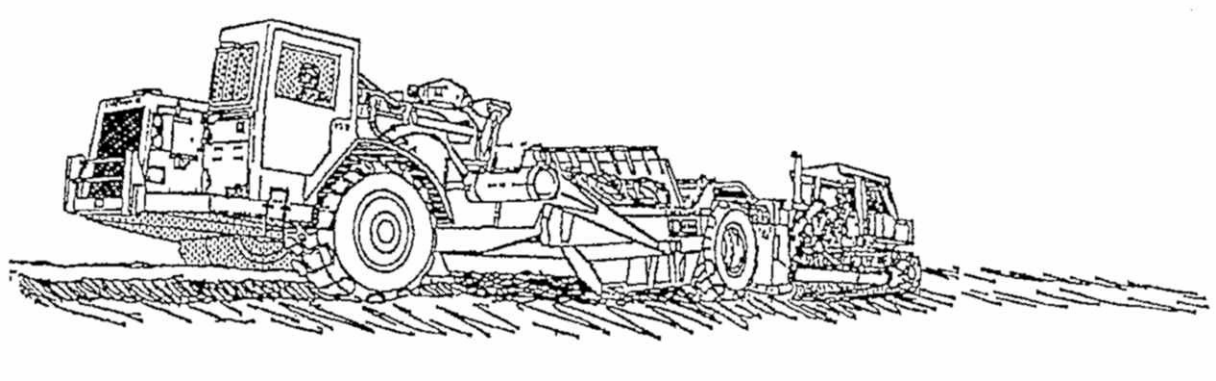
Dust and exhaust created by the use of equipment also affects the environment, avoid any unnecessary equipment usage.

Operator’s must be constantly aware of any equipment leaks, and correct them before they become a hazard.

Damage is caused by erosion due to rain; this erosion damage can be minimized by dressing off the work area at the end of the day.

a. Position crawler tractor at a 45-degree angle to the cut in preparation to push the scraper. (see fig. 4-1 below)

Figure 4-1 PUSH LOADING



b. After scraper enters the cut:

(1) Move the crawler tractor into the cut, behind the scraper.

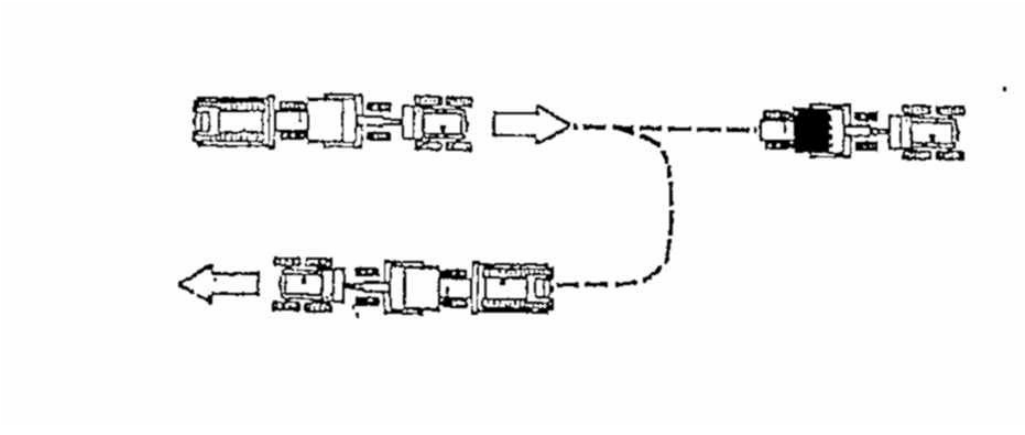
(2) As the crawler tractor moves forward in the cut, center the reinforced area of the blade on the scrapers push block. (see fig. 4-2 next page)

(3) Slows down and gently engages the crawler tractor blade to the push block. Do not slam into the scraper.

(4) Crawler tractor operator pushes the scraper in 2nd gear. Continue pushing the scraper through the cut, and out clear of the cut area (see fig. 4-2)

(5) Crawler tractor catches and makes smooth contact with the scraper push block.

Figure 4-2 SHUTTLE LOADING



c. Stop the scraper if necessary and allow the crawler tractor to make contact with the push block.

(1) Re-Positions crawler tractor for next pass:

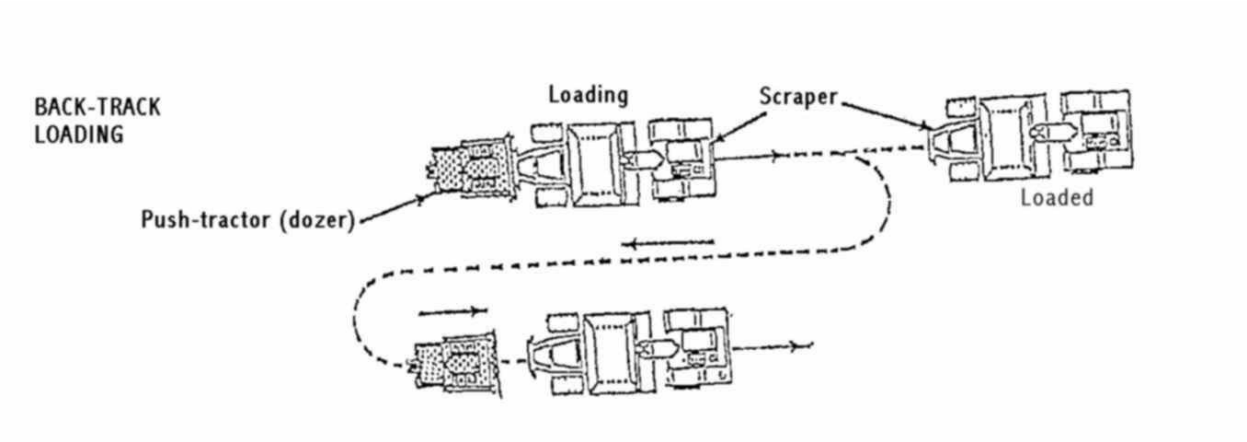
(a) Using the backtrack method (short cut impractical to load in both directions).

(b) Back the crawler tractor, to the right or left of the cut, all the way to the start point.

(c) Position the crawler tractor at a 45-degree angle (right or left) of the desired cut if no scraper is waiting.

d. Repeat steps b1 thru c1 if a scraper is waiting. (see fig. 4-3)

Fig. 4-3



(1) Crawler tractor having push loaded scraper number 1 in cut 1 backs up to push load scraper 2.

(2) Back track loading

(3) Scraper loaded heading to fill area.

e. Using the chain method (long cut):

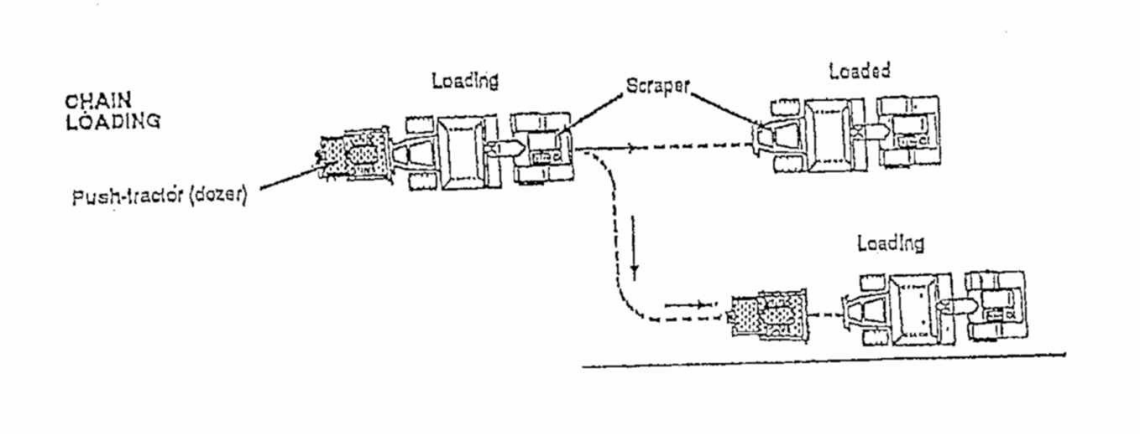
(1) Moves crawler tractor to a 45-degree angle of the same cut (right or left side) and waits for next scraper to continue the same cut.

(2) Moves crawler tractor over to a parallel cut, (right or left) and repeats steps 1 thru c1 on a waiting scraper. (see fig 4-4)

(3) Crawler tractor having push loaded scraper #1 in cut #1 moves over to a parallel cut to push load scraper #2

(4) Chain loading scraper #1 loaded heading to fill area.

Fig 4-4



f. Using the shuttle method (short cut and is possible to load in both directions):

(1) Turns crawler tractor around, and repeats steps b1 thru c 1 on waiting scraper.

(2) Turns crawler tractor around, and positions it at a 45-degree angle (right or left) to the desired cut if no scraper is waiting (see fig 4-5 below)

(3) Repeat steps a, b, and c until area is at desired depth.

ENVIRONMENTAL: Once you have completed the project, restore the area as close as possible to its original state.

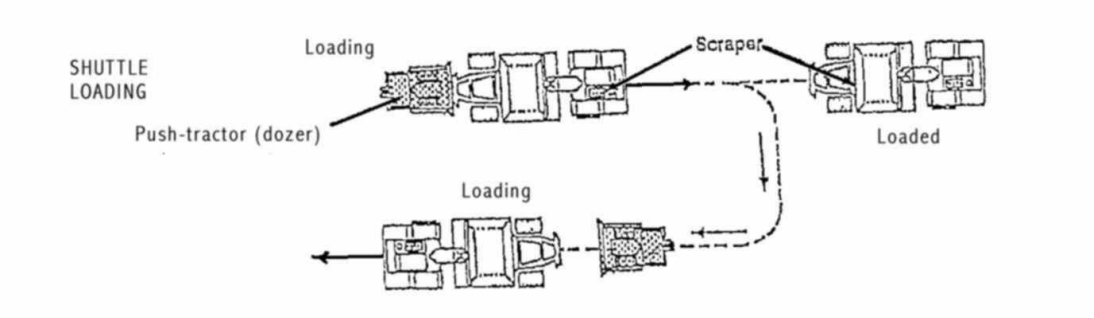
(4) Shuts down crawler tractor IAW TM 5-2410-237-10.

(5) Crawler tractor having push loaded scraper #1 in cut #1 turns around to push load scraper #2.

(6) Scraper #2 waiting to be loaded shuttle loading.

(7) Scraper #1 loaded heading to fill area.

Fig 4-5



Chapter 5

EXCAVATE MATERIAL FROM AN AREA WITH A MOTORIZED SCRAPER

1.PURPOSE: To provide the student with the guidelines and knowledge necessary to excavate material with a scraper.

2.SAFETY: Know and adhere to all hand signals. Maintain three points of contact when mounting or dismounting. Ground all attachments and engage park brake before dismounting. Make 360-degree walk-around before mounting and after dismounting. Seat belt will be worn. Go slow under dusty conditions.

3.REFERENCES:

a. TM 5-434, Earthmoving Operations, 30 Sep 92

b. TM 59-3805-248-14 &P1, P3 Scraper, Earth moving motorized diesel engine driven, Caterpillar Model 621B, 19 Aug 85

c. TM 6-2410-237-10, Tractor, Full Tracked, Low Speed: DED, Medium Draw Bar Pull, D7G, Jan 1993

d. STP 5-62E12-SM-TG, Tasks 051-254-1043, 1063, 25 Sep 1985

4.PRODUCTS: A properly trained operator in the techniques of excavating material with a motorized scraper.

5.PROCEDURES

ENVIRONMENTAL: Be aware of these environmental considerations:

While moving in off road terrain, avoid unnecessary damage to waterways or vegetation.

Dust and exhaust created by the use of equipment also affects the environment, avoid any unnecessary equipment usage.

Operator’s must be constantly aware of any equipment leaks, and correct them before they become a hazard.

Damage is caused by erosion due to rain; this erosion damage can be minimized by dressing off the work area at the end of each day.

a. Loading methods:

(1) Downhill loading:

NOTE: The crawler tractor will be positioned at a 45-degree angle to the cut in preparation to push the scraper.

ENVIORNMENTAL: When working on construction sites, do not over stip the area.

(a) Position the scraper at the top of the hill, facing downhill.

NOTE: Cutting from the top of the hill will allow you to use the force of gravity to increase production.

(b) Prior to entering the cut area with the scraper open the apron approximately twelve inches and move the ejector to the rear and lower the bowl approximately one inch above the ground.

(c) As the scraper enters the cut, gradually lower the bowl until forward momentum decreases.

(d) After the scraper enters the cut, continue moving forward until crawler tractor catches up to the scraper and begins pushing, unless tires begin to spin, then stop and allow crawler tractor to make contact before you continue.

NOTE: Until you become confident and proficient, the scrapper must be stopped at the beginning of the cut to allow the pusher to make smooth contact.

(e) Scraper operator then pushes down both differential lock and transmission hold pedal and places the transmission lever in 2nd gear.

(f) Keeps scraper in a straight line, and continues its forward motion and high RPM by adjusting the bowl control up or down.

(g) When the scraper is filled, simultaneously begin closing the apron and raising the bowl using the additional function. Alternate closing the apron and raising the bowl until scraper has cleared the cut. Allow the crawler tractor to assist the scraper out of the area.

(h) Scraper operator will receive hand signals from crawler operator, when the scraper clears the cut.

NOTE: After the scraper had left the cut, reposition the crawler tractor for the next scraper.

(i) The scraper then spreads the material.

(j) This method will increase production by allowing you to load more in less time.

(2) Straddle loading:

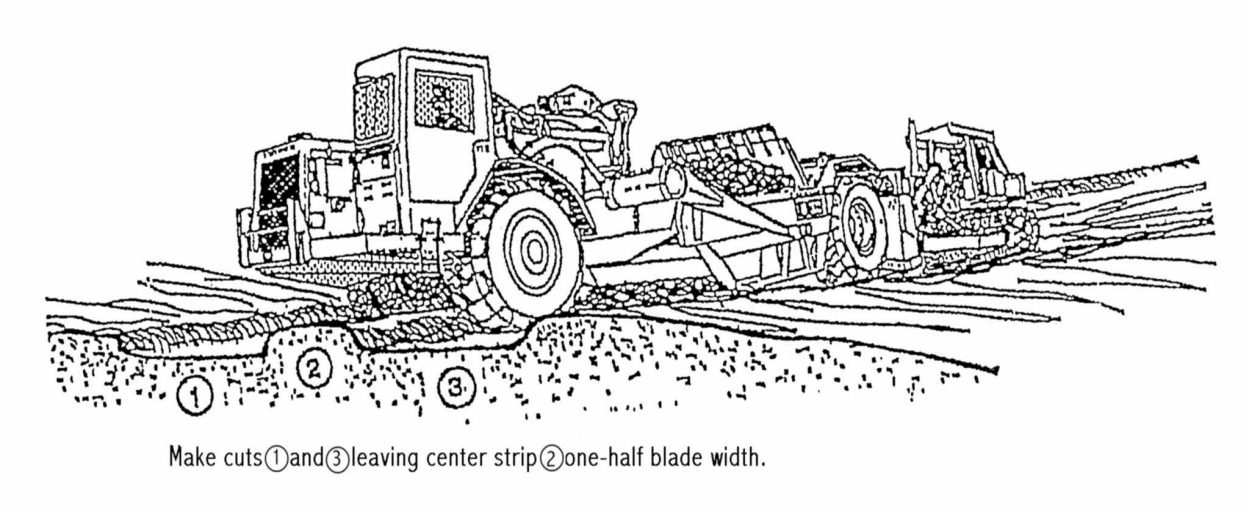
(a) After making the first pass of an excavation, that is wider than 1 pass, position the scraper for the second pass 4 to 5 feet to the right or left and parallel to the first pass, leaving the strip in the center.

NOTE: The first pass in this case, is the pass described in downhill loading above.

(b) Repeat steps 1a thru 1I to complete 2nd pass.

(c) The third pass is where you increase production to repeat steps 1a thur 1I to pick up 4 to 5 foot strip left in the center (see fig 5-1)

Fig 5-1



Make cuts①and③leaving center strip②one-half blade width.

(d) This method increases production on the 3rd pass by allowing you to load with less resistance, and if accomplished along with downhill loading, will increase production even more.

(3) Pump loading

NOTE: This will not be demonstrated due to the soil conditions, but will be explained as follows.

(a) Enters the cut area as fast as possible.

(b) Lowers the bowl slowly, picking up as much as possible using the scrapers momentum.

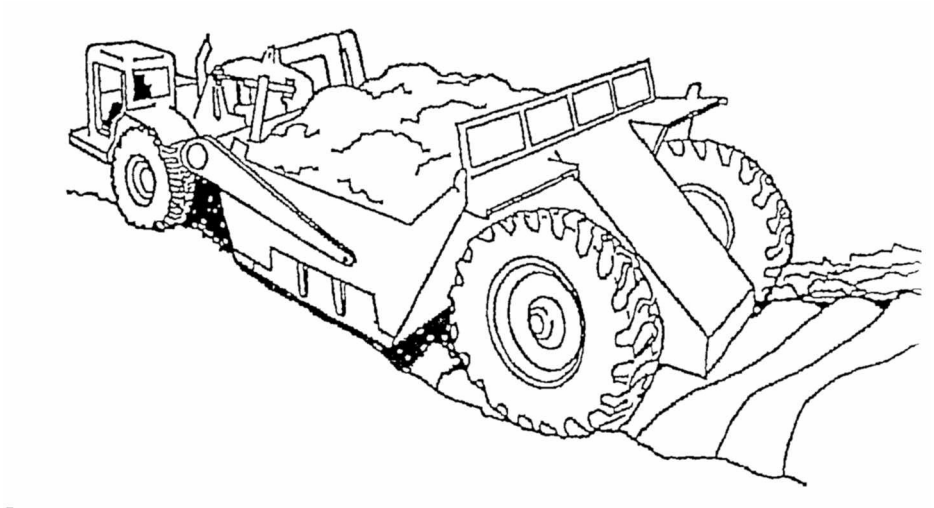
(c) Once the momentum is lost, shift transmission to a lower gear, and allow pusher to assist.

(d) Begin pumping the bowl up and down.

(e) Once the washboard is formed, as you can see the back wheels begin dropping into the washboard depression, drop

the bowl, as the back wheels raise, raise the bowl. (see figure 5-2)

Fig 5-2



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(f) To finish cut, drop the bow sharply 3 times then close the apron, raise the bowl, and exit cut area.

(g) This method allows you to load hard to load materials, such as sand.

(4) Shuts down scraper IAW TM 5-3805-248-14 & P-1, P-3.

CHAPTER 6

SPREAD FILL MATERIAL WITH A MOTORIZED SCRAPER

1.PURPOSE: To provide students with the guideline and knowledge necessary to spread fill materials with a scraper.

2.SAFETY: Know and adhere to all hand signals. Maintain three points of contact when mounting or dismounting. Ground all attachments and engage park brake before dismounting. Make 360-degree walk-around before mounting and after dismounting. Seat belt will be worn. Go slow under dusty conditions.

3.REFERENCES:

a. TM 5-434, Earthmoving Operations, 30 Sep 92

b. TM 59-3805-248-14 &P1, P3 Scraper, Earth moving motorized diesel engine driven, Caterpillar Model 621B, 19 Aug 85

c. TM 6-2410-237-10, Tractor, Full Tracked, Low Speed: DED, Medium Draw Bar Pull, D7G, Jan 1993

d. STP 5-62E12-SM-TG, Tasks 051-254-1043, 1063, 25 Sep 1985

4.PRODUCTS: A properly trained operator in the techniques of spreading fill material with a motorized scraper.

5.PROCEDURES:

ENVIRONMENTAL: Be aware of these environmental considerations:

While moving in off road terrain, avoid unnecessary damage to waterways or vegetation.

Dust and exhaust created by the use of equipment also affects the environment, avoid unnecessary equipment usage.

Operator’s must be constantly aware of any equipment leaks, and correct them before they become a hazard.

Damage is caused by erosion due to rain; this erosion damage can be minimized by dressing off the work area at the end of each day.

a. Load the scraper (as described in previous lesson).

(1) Hauling:

(a) Carry the bowl high enough to clear obstacles, 4 to 6 inches.

(b) Travel at the safe speeds for haul road condition.

(c) During training, only 2nd gear will be used.

(2) Spreading:

(a) As the scraper enters the spread area, adjust the bowl height to the depth of spread indicated by:

1 Ground guided (site supervisors).

2 Grade stakes (depends on situation).

(b) Spread material at the highest practical travel speed. Constant speed and RPMs, along with bowl height, help to maintain a uniform level lift.

(c) Open apron fully as the scraper reaches the point of spread. Move the ejector forward ejecting the material.

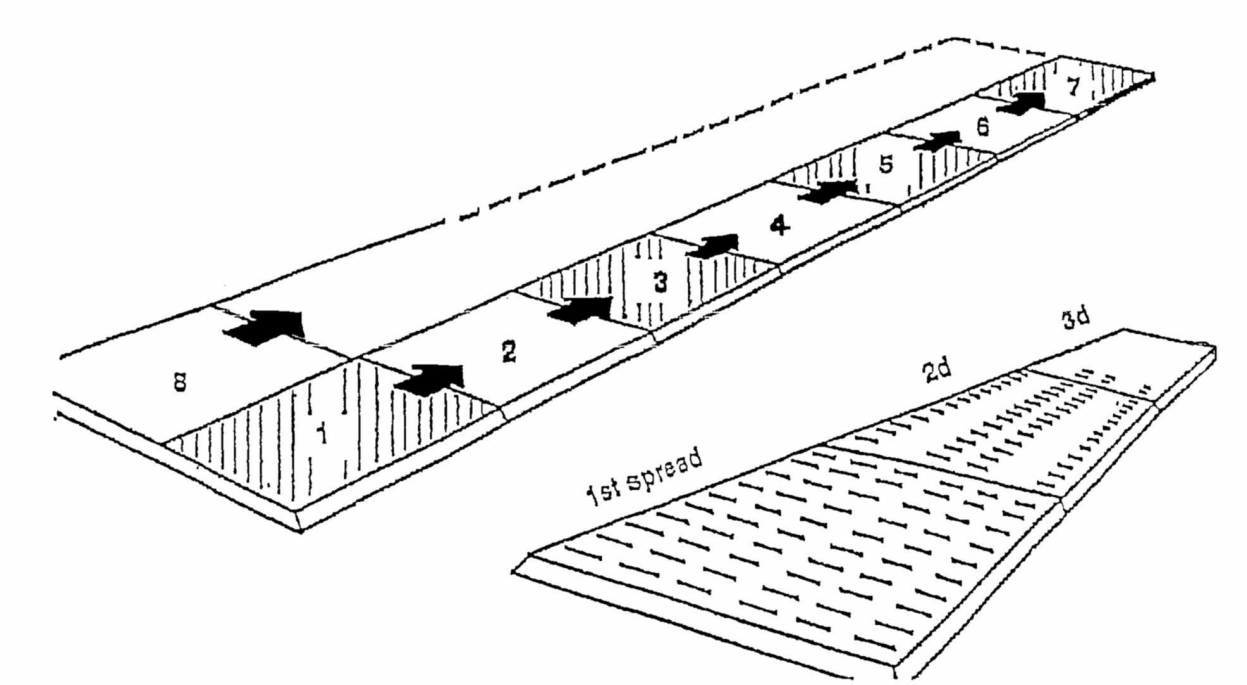
(d) Maintains a straight line throughout the spread.

(e) When all material has fallen from the bowl, close the apron, and return the ejector to the rear.

(f) Raise bowl slowly to clear obstacles (4 to 6 inches).

(g) Return to the loading area, and when loaded repeat steps b and c until mission is complete; ensuring that the additional spreads are overlapped, for the length and width of the fill area (see fig. 6-1)

Fig 6-1



ENVIRONMENTAL: Once you have completed the project, restore that area as close as possible to its original state.

MOTORIZED SCRAPER

PERFORMANCE EVALUATION

NAME _____ RANK _____ DATE _____

CLASS # _____ INSTRUCTOR _____ GRP # _____

	SCORE	1st	2nd
1. Perform operator's maintenance on a motorized scraper.	100		
2. Performs pusher assisted loading on a motorized scraper.	100		
a. Blade to high for pushing scraper	15		
b. Blade to low for backing up	15		
c. Touching controls while pushing	10		
d. Touching controls while pushing	15		
e. Stopping before scraper pulls away	15		
f. Dozer not repositioned for next scraper	15		
g. Making contact with scraper			
3. Excavate material with the motorized scraper			
a. Cut too deep or too shallow			
b. Cut too short or too long			
c. Improper control function			
d. Improper throttle control			
e. Cut not straight			
f. Improper throttle control			
g. Improper hand or foot repositioning			
4. Spread fill material with motorized scraper			
a. Apron not positioned for cut area			
b. Apron not fully open			
c. Break in the spread			
d. Spread is not straight			
e. Improper carry height			
f. Improper throttle control			
g. Improper foot or hand positioning			

TOTAL SCORE _____

NOTE: All students must receive at least a 70 in each task to pass.

REMARKS: _____

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